

By 9/6/04
Sawada
wherein, when the first and second wires are bonded, a first-bonding operation is performed on the first and second chips and a second-bonding operation is performed on the first and second conductivity patterns respectively. --

A copy of the marked up amended claims is attached to this response showing the changes as set forth in 37 C.F.R. § 1.121.

REMARKS

Claims 1-2, 4-9, and 11-15 are pending in this application. By this Amendment, claims 3 and 10 are canceled. Claims 1, 5, 6 and 9 are amended. Support for the amendment is found in the specification. No new matter is added.

This reply is submitted as a complete response to the outstanding Office Action. Reconsideration of the application in view of the above amendments and following remarks is respectfully requested.

MATTERS OF FORM

The Office Action rejects claims 1-10 under 35 U.S.C. § 112, second paragraph, asserting indefiniteness. Applicant has canceled claim 10 and amended claim 1 to obviate this rejection. Accordingly, Applicant respectfully requests the withdrawal of the rejection under 35 U.S.C. § 112, second paragraph.

PATENTABLE SUBJECT MATTER

The Office Action rejects claims 1-4, and 9 under 35 U.S.C. § 102(b) over Sawada et al. (U.S. Patent No. 5,652,425). The rejection of claim 3 is moot in view of its cancellation. However, the rejection of the remaining claims is respectfully traversed for the reasons set forth below.

Applicant's independent claim 1 recites a photosensor-amplifier device comprising, a photoelectric conversion circuit that converts an optical signal into an electric signal, a first electrode connected electrically to the photoelectric conversion circuit and by which the electric signal is extracted from the photoelectric conversion circuit, a second electrode connected physically to the photoelectric conversion circuit and formed in close proximity to the first electrode, an amplifier circuit that has a first input terminal and a second input terminal and that amplifies and then outputs a difference between electric signals fed to the first and second input terminals, a first wire that connects the first electrode to the first input terminal, and a second wire having substantially an identical length as the first wire and laid substantially parallel thereto, the second wire that connects the second electrode to the second input terminal.

Applicant's independent claim 9 recites an infrared communication device incorporating a photosensor-amplifier device, wherein the photosensor-amplifier device comprises, a photoelectric conversion circuit that converts an optical signal into an electric signal, a first electrode connected electrically to the photoelectric conversion circuit and by which the electric signal is extracted from the photoelectric conversion circuit, a second electrode connected physically to the photoelectric conversion circuit and formed in close proximity to the first electrode, an amplifier circuit that has a first input terminal and a second input terminal and that amplifies and then outputs a difference between electric signals fed to the first and second input terminals, a first wire that connects the first electrode to the first input terminal, and a second wire having substantially an identical length as the first wire and laid substantially parallel thereto, the second wire that connects the second electrode to the second input terminal.

Sawada discloses a photoelectric conversion module with a noise compensation circuit having preamplifiers 4 and 6 connected to a capacitor 5 and a photodiode 1. The photodiode 1 is connected to an input of the preamplifier 4 for outputting to a first output terminal 7. The capacitor 5 is connected to an input of the preamplifier 5 for outputting to a second output terminal 8. This circuit configuration corresponds in part to Applicant's circuit configuration shown in Applicant's Fig. 1D or Fig. 2D.

However, in contrast to Applicant's invention, the differential amplifier 600 shown in Fig. 3 of Sawada is an external circuit. See also col. 4, lines 39-44. Additionally, in operation, Sawada's preamplifier 4 amplifies signals and noises. While the preamplifier 6 is a dummy amplifier and does not amplify the signals. See col. 1, lines 66-67, for example. The noises that are picked up by the photodiode 1, the capacitor 5, and two preamplifiers 4 and 6 are not canceled within the package. Rather, Sawada requires an external circuit such as differential amplifier 600 to perform the cancellation. See col. 4, lines 25-34, for example. As stated above, the Applicant's invention provides a package that within itself has a noise-cancellation function, namely, by means of a differential amplifier, shown, for example, as OP in Fig. 1D or 2D.

Further, Figs. 1-3 of Sawada are schematic diagrams and not actual, physical illustrations of the locations and dimensions of the physical circuit elements. As such, Sawada's Figs. 1-3 cannot be construed to positively disclose or suggest first and second wires that are substantially identical in length and laid substantially parallel thereto. Rather, Fig. 4 and 5 of Sawada clearly illustrate the actual arrangement of the wires and physical circuit elements. Compare Sawada's schematic Figs. with Applicant's schematic Figs. 1D and 2D, for example. As can be seen from Sawada's Figs. 4-5, it is clear that Sawada

does not contemplate the wiring feature claimed in Applicant's independent claims 1 and 9.

Since Sawada's noise cancellation is performed by an external differential amplifier 600 and since Sawada is completely silent about Applicant's wiring feature, Applicant respectfully submits that Sawada does not disclose or suggest all the claimed features of Applicant's invention.

Claims 2 and 4 depend from claim 1. Therefore, for at least the above reasons, Applicant respectfully requests the withdrawal of the rejection under 35 U.S.C. § 102(b).

The Office Action rejects claims 1, 2 and 10 under 35 U.S.C. § 102(b) over Morita (U.S. Patent No. 4,626,678). The rejection of claim 10 is moot in view of its cancellation. However, the rejection of claims 1 and 2 is respectfully traversed.

Morita discloses a light detecting circuit having a dummy photodiode 1', a differential amplifier 2, and 2 resistors R1 or R1'. However, Morita does not contain any disclosure or suggestion relating to wires of substantially the same length and being substantially parallel. Accordingly, for the same reason discussed above regarding Applicant's independent claim 1, it is readily apparent that Morita does not disclose or suggest all the claimed features of Applicant's invention.

Claim 2 depends from claim 1. Accordingly, for at least the above reasons, Applicant respectfully requests the withdrawal of the rejection of claims 1 and 2 under 35 U.S.C. § 102(b).

The Office Action rejects claims 5 and 6 under 35 U.S.C. § 103(a) over Sawada and Agarwal et al. (U.S. Patent No. 6,175,438). This rejection is respectfully traversed.

Agarwal discloses an interference-rejecting circuit having detectors 201 and 202, preamps 203 and 204, interference-rejection element 205 (a differential amplifier,

corresponding to 305 in Fig. 3), etc. The interference-rejection of Agarwal is based on the principle of differential amplifiers which reject common-mode signals (see col. 3, lines 22-37). That is, when two interference signals having a common mode (e.g., same phase) enter the differential amplifier 203 or 305, they are canceled. To accomplish this, Agarwal arranges two input circuits, one consisting of 201 and 203, and the other consisting of 202 and 204. When these input circuits pick up a common mode interference (e.g., same noise), the interference is canceled. However, if two DATA signals having a common mode enter the same differential amplifier, they are also canceled. To overcome this deficiency, Agarwal must pre-arrange the DATA signal into two forms prior to feeding them into the differential amplifier 205 or 305. These two forms of the DATA signal are shown as "Optical Input" and "Compl Optical Input" in Fig. 2 or as "DATA" and "ALLDATA/bar" in Fig. 3.

Agarwal's Figs. are schematic diagrams and not actual hardware or circuit layout diagrams. Therefore, for the same reason discussed above regarding Sawada, Agarwal does not disclose or suggest first and second wires that are substantially identical in length and laid substantially parallel thereto. Accordingly, Applicant submits that Sawada and Agarwal, individually or in combination, do not disclose or suggest all the claimed features of Applicant's invention.

Claims 5 and 6 depend from claim 1. Thus, for at least the above reasons, Applicant respectfully requests the withdrawal of the rejection of claims 5 and 6 under 35 U.S.C. § 103(a).

The Office Action rejects claims 7 and 8 under 35 U.S.C. § 103(a) over Sawada in view of Watanabe (U.S. Patent No. 5,132,532). This rejection is respectfully traversed.

Watanabe simply discloses using bonding wires and conductor patterns in a photoelectric converter module. However, Watanabe fails to disclose a substrate on which a first element and a second element are mounted. Additionally, Watanabe fails to disclose or suggest a first conductor pattern and a second conductor pattern formed on the substrate. Additionally, Watanabe does not disclose or suggest a first and second wire which are substantially equal in length and substantially parallel.

It is readily apparent, therefore, that Watanabe does not supply the subject matter lacking in Sawada, as discussed above. Nor does Watanabe disclose or suggest all the claimed features of Applicant's claimed invention. Accordingly, Applicant respectfully submits that Sawada and Watanabe, individually or in combination, do not disclose or suggest all the claimed features of Applicant's invention.

Claims 7 and 8 depend from claim 1. Accordingly, for at least the above reasons, Applicant respectfully requests the withdrawal of the rejection of claims 7 and 8 under 35 U.S.C. § 103(a).

The Office Action rejects claim 10 under 35 U.S.C. § 103(a) over Agarwal. This rejection is moot in view of the cancellation of this claim.

CONCLUSION

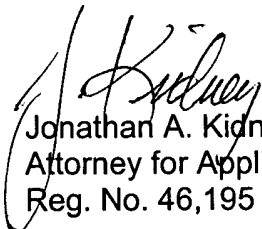
In view of the above remarks, Applicant respectfully submits that this application is in condition for allowance. Favorable consideration and prompt allowance of claims is earnestly solicited. Should the Examiner believe anything further is desirable in order to

place this application in even better condition for allowance, the Examiner is invited to contact Applicant's undersigned attorney at the telephone number listed below.

In the event this paper is not considered to be timely filed, Applicant respectfully petitions for an appropriate extension of time. The Commissioner is authorized to charge payment for any additional fees which may be required with respect to this paper to Counsel's Deposit Account 01-2300, referring to client-matter number 103213-00020.

Respectfully submitted,

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Enclosures: Marked-Up Copy of Amended Claims

MARKED-UP COPY OF AMENDED CLAIMS

1. (Once Amended) A photosensor-amplifier device comprising:
a photoelectric conversion circuit that converts an optical signal into an electric signal;
a first electrode connected electrically to the photoelectric conversion circuit and
by [way of]which the electric signal is extracted from the photoelectric conversion circuit;
a second electrode connected physically to the photoelectric conversion circuit
and formed in close proximity to the first electrode [that is not directly connected to the electric signal];
an amplifier circuit that has a first input terminal and a second input terminal and that amplifies and then outputs a difference between electric signals fed to the first and second input terminals;
a first wire that connects the first electrode to the first input terminal; and
a second wire having substantially an identical length as the first wire and laid substantially parallel thereto, the second wire that connects the second electrode to the second input terminal.
5. (Once Amended) A photosensor-amplifier device as claimed in claim 1,
wherein the photoelectric conversion circuit includes a photodiode built by joining an N-type semiconductor and a P-type semiconductor together,
the first electrode is connected electrically to one end of the photodiode, and the second electrode is electrically open.
6. (Once Amended) A photosensor-amplifier device as claimed in claim [5] 1,

wherein the photoelectric conversion circuit [further] includes a photodiode comprised of joining an N-type semiconductor and a P-type semiconductor together and a [dummy photodiode built by shielding a top surface of a photodiode] diode comprised of joining an N-type semiconductor and a P-type semiconductor together and shielded from light;

the first electrode is connected electrically to one end of the photodiode; and
the second electrode is electrically open.

9. (Once Amended) An infrared communication device incorporating a
photosensor-amplifier device,

wherein the photosensor-amplifier device comprises:

a photoelectric conversion circuit that converts an optical signal into an electric
signal;

a first electrode connected electrically to the photoelectric conversion circuit and
by [way of] which the electric signal is extracted from the photoelectric conversion
circuit;

a second electrode connected physically to the photoelectric conversion circuit
and formed in close proximity to the first electrode [that is not directly connected to the
electric signal];

an amplifier circuit that has a first input terminal and a second input terminal and
that amplifies and then outputs a difference between electric signals fed to the first and
second input terminals;

a first wire that connects the first electrode to the first input terminal; and

a second wire having substantially an identical length as the first wire and laid substantially parallel thereto, the second wire that connects the second electrode to the second input terminal.